CLAIMS

1. A load controller provided in a hydrostatic transmission for a work vehicle, wherein

power supplied from an engine is branched to drive an implement system and a traveling system, and a hydrostatic transmission is provided in the traveling system;

the hydrostatic transmission connecting, in an oil-hydraulic closed circuit, an oil-hydraulic pump driven by the engine and an oil-hydraulic motor driven by the oil-hydraulic pump;

the load controller comprising a bypass oil line for bypassing an oil line that has high pressure during forward movement in the oil-hydraulic closed circuit to reach an oil line that has low pressure during forward movement or an oil tank; a first opening/closing valve for opening or closing the bypass oil line; and an opening/closing valve controller that detects a load applied to the engine while traveling during working and opens the first opening/closing valve when the load exceeds a predetermined level.

2. A load controller according to Claim 1, wherein the opening/closing valve controller comprises a centrifugal governor that detects the number of revolutions of an output shaft of the engine or a revolution number detection shaft connected to the output shaft and opens the first opening/closing valve depending on the number of revolutions.

3. A load controller according to Claim 1, wherein the opening/closing valve controller is a torque sensing governor that detects load torque that affects an

output shaft of the engine, and opens the first opening/closing valve depending on the detected load torque.

4. A load controller according to Claim 1, wherein a second opening/closing valve is provided on the valve-outlet side of the first opening/closing valve that opens or closes the bypass oil line by external operation.

5. A load controller according to Claim 4, wherein the work vehicle comprises a clutch for an implement that supplies and halts transmission of power from the engine to the implement system, a clutch lever for an implement for operating the clutch for the implement, and a clutch interlocking system for an implement that connects the clutch lever for the implement to the second opening/closing valve; and

the clutch interlocking system for implement is structured so as to open the second opening/closing valve when the clutch lever for the implement is in the ON position and close the second opening/closing valve when the clutch lever for the implement is in the OFF position.

6. A load controller according to Claim 5, wherein an intermediate switching mechanism that can open or close the second opening/closing valve when the clutch lever for the implement is in the ON position is provided in a clutch interlocking system for the implement.

7. A load controller according to Claim 4, wherein the work vehicle comprises a speed change gear in the traveling system for switching the traveling speed between a working speed and a non-working speed; a gearshift for controlling the speed change gear; and a gearshift interlocking system for connecting the gearshift

and the second opening/closing valve;

the gearshift interlocking system being so structured so as to open the second opening/closing valve when the gearshift is at a working speed position, and to close the second opening/closing valve when the gearshift is at a non-working speed position.

8. A load controller according to Claim 7, wherein an intermediate switching mechanism that can open or close the second opening/closing valve when the speed change gear is at a working speed position is provided in the gearshift interlocking system.

9. A load controller according to Claim 4, wherein either the oil-hydraulic pump or the oil-hydraulic motor has an adjustable swash plate, an adjustable swash plate control lever for adjusting the inclination angle of the adjustable swash plate, and an adjustable swash plate interlocking system for connecting the adjustable swash plate control lever to the second opening/closing valve;

the adjustable swash plate interlocking system opening the second opening/closing valve when the adjustable swash plate control lever is at a working speed position and closing the second opening/closing valve when the adjustable swash plate control lever is at a non-working speed position.

10. A load controller according to Claim 9, wherein an intermediate switching mechanism that can open or close the second opening/closing valve when the adjustable swash plate control lever is at a working speed position is provided in the adjustable swash plate interlocking system.

11. A load controller according to Claim 4,

wherein a flow control valve is provided between the first opening/closing valve and the second opening/closing valve.

12. A load controller according to Claim 1, wherein a check valve with a set-pressure adjuster is provided in the valve-outlet side of the first opening/closing valve; the check valve with a set-pressure adjuster allowing only a one-way flow of a working oil from the valve-outlet side of the first opening/closing valve in the bypass oil line and having the ability to stop the one-way flow by external operation.

13. A load controller according to Claim 12, wherein the check valve with a set-pressure adjuster comprises a valve body, spring, and movable spring receiver,

the work vehicle comprising a clutch for the implement to supply and halt power transmission from the engine to the implement system, a clutch lever for the implement that controls the clutch for the implement, and a clutch/check valve interlocking system that connects the clutch lever for the implement to the movable spring receiver,

the clutch/check valve interlocking system being structured so as to increase the set pressure of the spring by turning off the clutch lever for the implement and transferring the movable spring receiver toward the valve body, and to stop the one-way flow in the bypass oil line at the OFF position of the clutch for the implement, and

an intermediate switching mechanism being provided in the clutch interlocking system for the implement, the intermediate switching mechanism being able to control the set pressure of the check valve with a set-pressure adjuster when the clutch for the implement is at

the ON position.

14. A load controller according to Claim 12, wherein the check valve with a set-pressure adjuster comprises a valve body, spring, and movable spring receiver,

the work vehicle comprising a speed change gear in the traveling system that can switch the traveling speed between a working speed and a non-working speed; a gearshift for controlling the speed change gear; and a speed change gear/check valve interlocking system that connects the gearshift to the movable spring receiver,

the speed change gear/check valve interlocking system being structured so as to increase the set pressure of the spring by moving the movable spring receiver toward the valve body when the gearshift is in a traveling speed position and stopping the one-way flow; and

an intermediate switching mechanism provided in the speed change gear/check valve interlocking system, the intermediate switching mechanism being able to control the set pressure of the check valve with a set-pressure adjuster when the speed change gear is in a traveling speed position.

15. A load controller according to Claim 12, wherein the check valve with a set-pressure adjuster comprises a valve body, spring, and movable spring receiver;

the work vehicle comprising an adjustable swash plate control lever to provide the oil-hydraulic pump of the hydrostatic transmission with stepless speed variation, and an adjustable swash plate/check valve interlocking system that connects the adjustable swash plate control lever to the movable spring receiver,

the adjustable swash plate/check valve

interlocking system being structured so as to increase the set pressure of the spring by moving the movable spring receiver toward the valve body when the adjustable swash plate control lever is at a non-working speed position, and to stop the one-way flow; and

an intermediate switching mechanism provided in the adjustable swash plate/check valve interlocking system, the intermediate switching mechanism being able to control the set pressure of the check valve with a set-pressure adjuster when the adjustable swash plate control lever is in a working speed position.

16. A load controller according to Claim 2, wherein the centrifugal governor is disposed on a rotating axis that operates in collaboration with the oil-hydraulic pump of the hydrostatic transmission, and the centrifugal governor is provided in the hydrostatic transmission together with the load controller.

17. A load controller according to Claim 16, wherein the centrifugal governor is housed in a closed chamber adjacent to the load controller, lubricating oil is held in the closed chamber, and the centrifugal governor comprises a flyweight and is structured so that the surface of the lubricating oil comes into contact with the flyweight when the flyweight opens.

18. A load controller according to Claim 1, wherein a flow control valve that controls the rate of flow in the bypass oil line is provided in the valve-outlet side of the opening/closing valve.

19. A load controller according to Claim 18, wherein the opening/closing valve and the flow control valve are housed in a same valve casing.

20. A load controller according to Claim 1, wherein the opening/closing valve is a solenoid-operated valve and the opening/closing valve controller comprises a temperature sensor for detecting the temperature of exhaust gas from the engine, and a controller that opens the opening/closing valve depending on the exhaust gas temperature detected by the temperature sensor.

21. A load controller according to Claim 1, wherein the opening/closing valve is a solenoid-operated valve, and the opening/closing valve controller comprises a pressure sensor for detecting oil pressure in an oil line that has high pressure during forward movement, and a controller that opens the opening/closing valve depending on the oil pressure detected by the pressure sensor.